

Disinfection of λ.

526

4/21/49.

A) Prepare T(m) 50ml. Add 1:5 deoxypyridoxine (Dopy) 25 mg/ml to make final level of 5 mg/ml. Inoculate lightly  $\pm$  W677

- |         |   |  |
|---------|---|--|
| 1. P21  | A23: no growth.   | 10/10 λ+   |
| 2. P24  | Faint turbidity. Transfer to second tube and streak on Lact EM B. |  |
| 3. A25. | Turbid - 3d transfer.   |  |
| 4 A26:  | Streaks out P26. 15 tests all λ+                                  | very high growth in thick streaks.<br>Isolated colo. ox. |

B) Grow W677 at 44-45° in # 82 50ml, repeated transfer.

- |             |  |
|-------------|--|
| 1. A22      | P26. Streak B10 for examination of single colonies |
| 2 P22       |  |
| 3. A23      |  |
| 4 P23       |  |
| 5. Late P23 |  |
| 6 A25       |  |
| 7 P24       |  |
| 8 A25       |  |
| 9 P25       |  |
| 10 A26      |  |
- 15 tests all λ+!

Neither deoxypyridoxine nor ~~is~~ high temp. succeeded in disinfecting λ.

Differential phages.

527

4/22/49

Test plaques from Chi. sewage for differential as 518, 811 + 887

$\lambda^-$      $\lambda^+$      $\lambda^R$

These were scored on bac EMB; as W887 is bac+, they score very poorly.  
These test are for  $\lambda^+$ - differential only:

A22: No  $\lambda^+$ - differentials noted in 100 tests

A23 Test plaques on  $\lambda^-$ ,  $\lambda^+$  and  $\lambda^R$  (and 887)

150 tests. No differentials

1 apparently lytic (filled centres). Strains out as 527-1.

A24. As above. 60 tests

No differentials.

→ Bacteria isolated not lytic; all clear & plaqueless.

Probably resistant bacteria were picked along with phage from initial plaque.

A25

67 tests.

No diff.

P26

65 tests

No diff.

P27

28 "

" "

420 tests      No diff.

Map Mal.

4/28/49.

				A	B	C
1.	58-161 x W677			Male EMS (0)	(B <sub>1</sub> )	(B+B <sub>1</sub> )
2.	W78 x W677					

Pick Malt + to EMS DO, Lec

Additional

Totals :

Lec:		+	-	$\Sigma$
1 A	7	4		11
B	38	60		98
C	41	44		85
	86	108		

200

2	A	14	27	41	3 foot
	B	48	72	120	
	C	38	99	137	
		200	198		

3 foot

Mal.

Ratio from plate counts : (by D.H.S.)

1A	+ 3 2 7 1 2	- 16 6 10 6 14	10	+ 19 17 26 77 43	- 146 173 114 396 248	12	+ 9 8 14 12 8	- 19 22 22 26 32
2	15	52	24% +	182	1077	14,5% +	8 51	121 30% +

Picks Malt + Lact and Lac- from pure tests separately to other sugars, and confirms Mal reactions.

1 A      7 L+      3 L-  
Isol.      Mal

1      +  
2      ++  
3      +++  
4      ++++  
5      ++++  
6      ++++  
7      -

MHL

-  
-  
-  
-  
-  
-  
-

Xyl

-  
-  
-  
-  
-  
-  
-

Ag.

-  
-  
-  
-  
-  
-  
+

4/34-  
32-

L+

L-

I B.

L+

Mal

21  
20  
31  
32  
33  
34  
35  
36  
37  
38  
39

Xyl

-  
-  
-  
-  
-  
+

Isol.

+  
+  
+  
+  
+

MHL

-  
-  
+  
-  
-

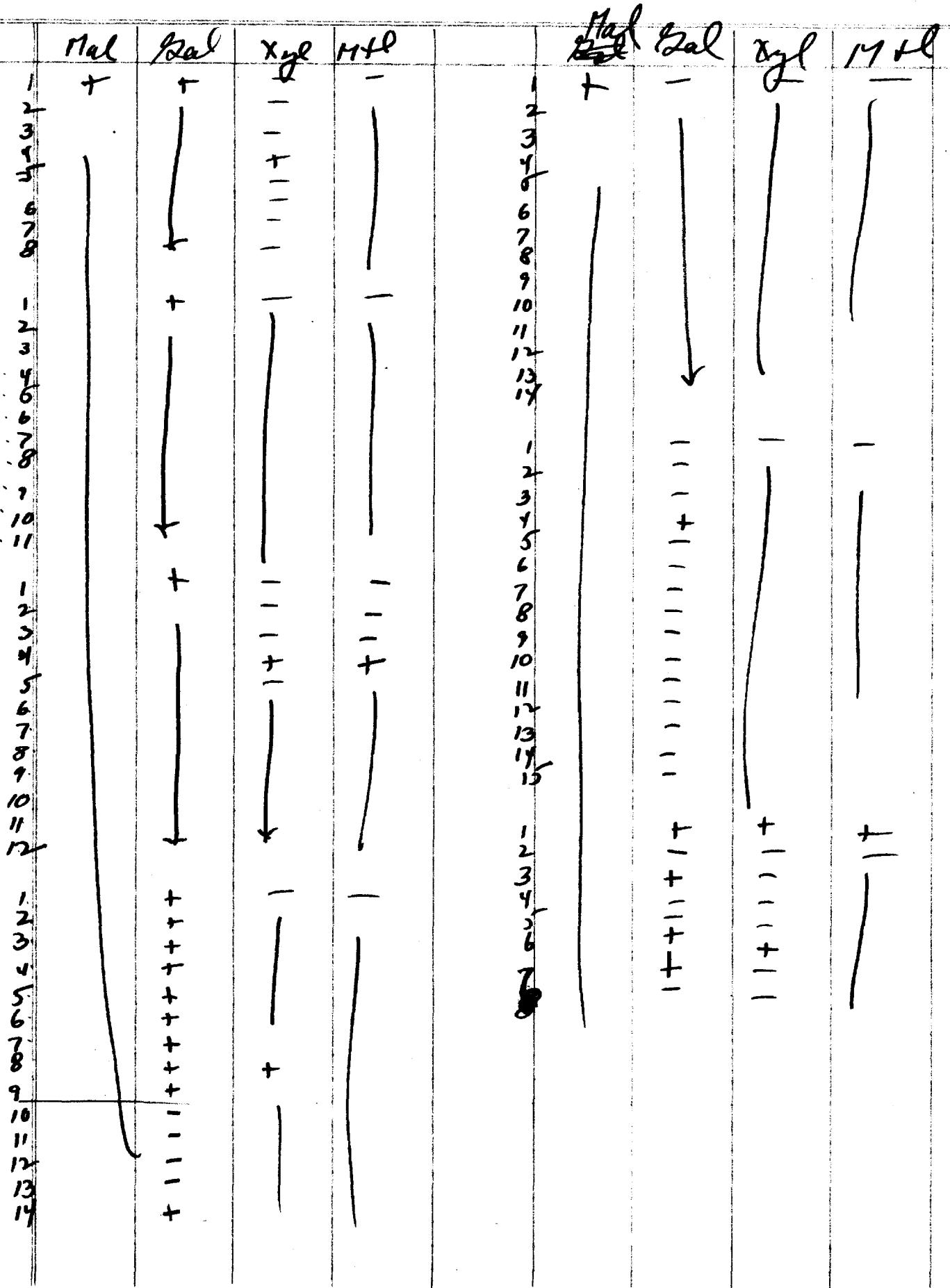
8	+	+	-
9	+	++	-
10	+	++	-
11	+	++	-
12	+	++	-
13	+	++	-
14	+	++	-
15	+	++	-
16	+	++	-
17	+	++	-
18	+	++	-
19	+	++	-
20	+	++	-
21	+	++	-
22	+	++	-
23	+	++	-
24	+	++	-
25	+	++	-
26	+	++	-
27	+	++	-
28	+	++	-

Mel	Sal	Xyl	Mtl	Mel	Sal	Xyl	Mtl
+	-	-	-	+	-	-	-
36	36	78	80	79	81	83	85
37	37	80	82	82	84	86	88
38	38	82	84	84	86	88	90
39	39	84	86	86	88	90	92
40	40	86	88	88	90	92	94
41	41	88	90	90	92	94	96
42	42	90	92	92	94	96	98
43	43	92	94	94	96	98	100
44	44	94	96	96	98	100	-
45	45	96	98	98	100	-	-
46	46	98	100	100	-	-	-
47	47	100	-	-	-	-	-
48	48	-	-	-	-	-	-
49	49	-	-	-	-	-	-
50	50	-	-	-	-	-	-
51	51	-	-	-	-	-	-
52	52	-	-	-	-	-	-
53	53	-	-	-	-	-	-
54	54	-	-	-	-	-	-
55	55	-	-	-	-	-	-
56	56	-	-	-	-	-	-
57	57	-	-	-	-	-	-
58	58	-	-	-	-	-	-
59	59	-	-	-	-	-	-
60	60	-	-	-	-	-	-
61	61	-	-	-	-	-	-
62	62	-	-	-	-	-	-
63	63	-	-	-	-	-	-
64	64	-	-	-	-	-	-
65	65	-	-	-	-	-	-
66	66	-	-	-	-	-	-
67	67	-	-	-	-	-	-
68	68	-	-	-	-	-	-
69	69	-	-	-	-	-	-
70	70	-	-	-	-	-	-
71	71	-	-	-	-	-	-
72	72	-	-	-	-	-	-
73	73	-	-	-	-	-	-
74	74	-	-	-	-	-	-
75	75	-	-	-	-	-	-
76	76	-	-	-	-	-	-
77	77	-	-	-	-	-	-

一

1-40+

- 41-82 -



2 A

. 142 +

15-41 L -

2 B

1-45+(lac)

46-83-

40

1-2-2 L+

23-70L-

all Mal+

Lac+	Mal-Xyl - 4	Mal+Xyl + 1	Mal-Xyl + 1
Lac-	3	0	1

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1B	Lac+	All Gal+	Mal-Xyl-33	++5	-+	1	39
----	------	----------	------------	-----	----	---	----

Lac-	8 Gal+	--	++1	-+	3	55
	43 Gal-					

1C	Lac+	All Gal+	--37	++1	-+	2	40
----	------	----------	------	-----	----	---	----

Lac-	6 Gal+	--38	++1	-+	2	41
	35 Gal-					

No apparent linkage of Mal to Lac.

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2A	Lac+	All Gal+	--3	8++	-+2	+-1
----	------	----------	-----	-----	-----	-----

Lac-	9+	--14	13++	-+2	+-1
	asari				

---

2B.	Lac+	40 Gal+	--19	12++	-+14	+-0
		5 Gal-				

Lac-	3+	--30	5++	-+2	+-1
	others -				

2L Lac+ 22 Gal+ - - 11 ++ 7 - + 4

Lac- 8 Gal+ 37 - ++ 9 - + 1 + - 1  
40 Gal-

Clearly the Net cross has a higher proportion of Gal+.

Gal- and A1 - mutation runs. 531

4/25/49.

	Y10	50 x 300	Gal E4B	4V 7 secs.	15,000	8 mutants.
A.	w 909	Gal	Az	Glu	Lac	Xyl
	911	-	++	-	+	+
	912	-	-	++	-	-
	913	-	±	++	+	+
	914	-	±	±	+	-
	910	-	-	-	-	+
	915	-	±	++	-	-
	916	8	-	+	+	-
			- thin	-	- thin	good growth
B.	w 894	25 x 100	=		10,000.	A1 E4B
	w 904	-	✓	-	-	+
	905	-	-	++	-	-
	906	-	-	++	-	-
	907	-	-	++	-	-
	908	5	-	-	-	+

A1 and A6 are the only ones suitable for independent markers  
and B1

Use 904 for continuation

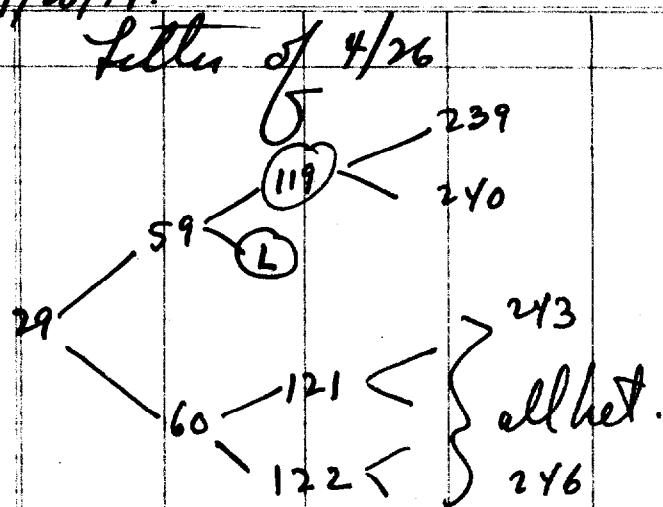
4/27/49

1.	Cross W898 x W518; 899 x 518.	MEMS Lac.	All Lac -.
11(898x)	tested. All $\lambda^R$ $p20^S$	$10 \lambda^R$ $1 \lambda^S$	Apparent sign as quantic factor.
32(899x)	" All $\lambda^R$ .	$2 p20^S$ ; $30 p20^R$ .	Test for <u>Mal</u> , V, linkages.
2.	Pick 898 at cross streaks in $\lambda$ . Stake out. Test 20 single colonies all have $\lambda^-$ .		
3.	Test infectivity of $\lambda^R$ ; $p20^R$ : Stakeout portions of W518 and W898; 9 on Mal E M B. Test Mal+ (W518):		
	10 from W898 all $\lambda^S$ $p20^S$		
	10 " " " "		$\therefore$ Resistance of W899 is not infective.
2a.	Do 899 All $\lambda^-$ $\Sigma$ one <sup>doubtful</sup> possible exception. Stake this out as # 533-2a. 6 colonies retested were $\lambda^-$ .		
	898 x #1 $\lambda^R$ Test Mal, T1. 2 " $\lambda^R$ Mal+V, R 6 Mal-V, R 4 Mal-V, S		
	899 x 1-2 $p20^S$ $\Sigma$ Mal-V, R; Mal-V, S others $p20^R$ 5. 3 Mal+V, R; 30 Mal-V, R 13 Mal-V, S		
		46	

Zelle's series 5.

534

4/28/49.



239 }  
240 }  
Pure Lac + Xyl - Mtl - Gal - Hg - ?  
Check induction, 4 responses.  $V_{1c}^R V_1^S$  TLB, BMT. (proto)

Xylose - mutant run  
Mannitol - " "

535

April 30, 1949.

$40 \times 500 = 20,000$  in Xyl EMB. W904 7sec uv.

a) First sequence, readily isolated.

1-12

12 mutants, all Xyl- Mtl+ Gln+

W917-928.

Use 1-6 for Mtl- mutants.

b. Second sequence

~~1-16~~

W929-944

May 3, 1949.

Use 1-8 above (W917-924) for Mtl EMB-uv 7sec.

radiations

Mannitol Mutants:

Splashed each  $\times 300 = 1500 \times 8 = 12,000$

Tentative No. From

1	1	Slow
2	1	+ Mucoid
3	2	"
4	2	+ slow
5	3	slow
6	3	slow
7	3	+
8	4	+
9	5	slow
10	5	slow
11	5	slow
12	6	-
13	6	slow
14	7	+
15	8	+

Gln Mtl

from W922

W945

8

differential phages.

537

5/5/55 ff.

See:

58 tests

*φ* action on W887 inhibited on T2 plates!

21

tests.

Het outcross

538

5/7/49.

W826 x

q1 WY66

2 W477

40 tested 5/9: 2 heterozygotes: 538/11, 12

60 + colo. tested. No heterozygotes.

100+ cols.  
108 tested 5/9" 5% hits.  
" 8 suspect.Heterozygotes in suis 2 confirmed.

538: 1-5.

8 additional in second set. 6-13

W826 x W477

~~11~~

Get in and out cross

539

5/7/49

W478 x  
a W477  
b W945

EMStar and  $\beta$ ,

$a/B$	+	-
	147	40
	25	11
	244	56
	9	2
	47	11
	103	27
51	<del>51</del>	18
	226	47

854 212 1066

$a(0)$

+ 59	58
95	1
71	3
72	2
123	3
85	2
76	2

581 24 / 605

$b(B_1)$	309	26
	177	49
	283	13
	361	48
	221	24

1354 160 1/1514

163	11
239	26
278	18
115	4
179	3
158	7
84	4

1216	73	1289
------	----	------

Picks + colonies and test for lac v.

A 100 1-11 11 ceteris 12-20<sup>1</sup> 9 doubtful bac v.  
B 148

1-20. off 12-20, #16 is jet  
others probably not.

Almost every streak has colonies which are doubtful bac.v: light + varior., mostly central. Densely mottled appearance resemble yeast plates. Select most likely bac.v.

Many lac glow protographs! probably lac + Q- where Q- is speculative!

WY78 x W945.

539 B.

5/13/49:

8 possible heterozygotes picked and tested on various sugars:

Lec	Mal	Gal	Xyl	Mtl	Glu
-	-	-	+ v?	-	+
-	-	-	+ v?	+	++
		+	* v	-	++
		+	+ v	+	++
		+	+ v	+	++
		+	+ v	+	++
		+	+ v	+	++

no clear explanation of the bac-slow segregants.

see 553

## Sorbitol Mutation Run.

540

May 10, 1945

W945

40 plates  $\times$  300 = 12,000 tests. uv7secs Sorbitol E-43  
chalc on glucose.

	Glu	T5	Sorbi.
1	+	P	+
2	++	P	"
3	++	S	"
4	++	S	"
5	++	S	"
6	++	S	"
7	++	S	"
8	++	S	"

Zelle's 6 and 7 series

541

5/11/49.

7:	Sent "Mass" cultures of 159-161; 175-181; 187-190; 368-8. and "Moss Col." " " 175-190. Study on EMS Xyl; EMB Xyl; EMB Lac:	Zelle Col.	EMS Xyl not mostly g. all-	Lac	Xyl. only - recovered " " only - recovered
1	159	Sig.	n.g.		
2	160	Sig.	n.g.		
3	161	Sig.	n.g.		
4	181 Mass	Sig.	n.g.		
5	181 Moss Col.	Sig.	n.g.		
6	184	Sig.	n.g.		
7	368	Sig.	n.g.		
8	367	Sig.	n.g.		
9	185	Sig.	n.g.		
10	186	Sig.	n.g.		
11	187	Sig.	n.g.		
12	188	Sig.	n.g.		
13	189	Sig.	n.g.		
14	190	Sig.	n.g.		
6:	56	EMB Lac	n.g.		
	58		g.		
	"		g.		
	112		g.		

Is 56 a H168 sp?

5/22. Recover Xyl + colonies from EMS and S.O. EMB Xyl to check on heterogeneity.

Lac<sub>v</sub> recovered from 6:111(7,8) streak out 7a, b 8a, b  
a. from EMB Lac<sub>v</sub>; b from EMS Xyl brush.

~~8 total 1-6 only - recovered  
7,8 Lac<sub>v</sub>~~

(but not Xyl<sub>v</sub> !!)

37-segugants

541a

		bac	Xyl	Thal	Mtl	Ar	Gal	T5	
1.	6-58	-				-		R	
2.	7-184	-	-			-	-	R	
3.	185	-	-			-	-	"	
4.	186	-	-			-	-	"	
5.	187	-	-			-	-	"	
6.	188	-	-			-	-	"	
7.	189	-	-			-	-	"	
8.	190	-	-			-	-	"	
9.	367	-	-			-	-	"	
10.	368	-	-			-	-	"	

all alike.

544.

Test Het x Het.

May 21, 1979.

		W477x
D	1	W978
Q	2	979
E	3	980
	4	981

Gal - {  
 } 977 = Mal - W478.

IL = A 1-8      IM = B. 1-4.

C, D, E = 2, 3, 4 Lac

Test only 4 from 2 in C.  
E3 = C5.

A

Lac	V
1	V
2	V+
3	V
4	V
5	V
6	V
7	V
8	V
1	V
2	V
3	V
4	V

Mal	V
1	V
2	V
3	V
4	V
5	V
6	V
7	V
8	V
1	V
2	V
3	V
4	V

Gal	+
1	++
2	++
3	++
4	++
5	++
6	++
7	++
8	++
1	++
2	++
3	++
4	++

Lac	V
1	V
2	V
3	V
4	V
5	V
6	V
7	V
8	V
1	V
2	V
3	V
4	V

C

D

E

B

Strain out from EMS lac

A6 H205

D4 H206

544

54a

Rejet "held"  
material is overwhelmed.

I.	48 on Lac EMB.	8 distinctly Lac v.			
#.	12 colonies from Mal EMS to Mal EMB.	5 Mal - (misread as EMS). 3 Mal + 4 Mal <u>v</u> !			
II	Some Lac v rather indistinct, probably owing to weak Lac + Sal -. 56 EMS lac + to EMB.	5 definite Lac v picked 5 additional held for further incubation -			
III	<del>44</del> 56	Likes II no general component Picks 4 Hold 8			
IV	44.	Picks 2 Hold 2			

May 22, 1949.

A. W990 (Y10 Glu-) x W618 (BM Gal-) (later ~~lac~~ appears to be Lac stock).

canal

chule other Gal - BM - stocks:

	Glu	Lac	Gal
619	++	-	-
625	++	++	-
626	++	++	-
990	--	++	+

{ suitable for cross!

Test 990 hemagglutinates for fermentation: washed cells

3:55

	Lac	Glu	10m.
	+	-	
	-	-	
	++	-	

5/24/49. Cross W625 and W626 = W990 on  
EMS Lac.

5/24/49.

(A) Mg. Following Kraysc, inoculate 58-161 + W677 <sup>(1)</sup> hairy into NSB + 1/2 MgSO<sub>4</sub>. Shake 3 hours, wash and plate.

(2) Controls: saline. *Streak out on EMB lac.*  
(+, - no, several colonies.)

(B) Use A2 above. Plate on EMS lac and T(0) and incubate at various temperatures. 30, 37 and 44.

30° 9 Lac+ 15 Lac-

37° 12+ 12-

44° 10 Lac+ 14 Lac-

(C) Plate on T(Mg 1/3) 37°

12 Lac+ 12 Lac-

Counts / 4 plates

		/plate
A1	573	143
A2	106 ( $\times \frac{1}{2}$ )	27
B 30	23	23
37	26	23
44	23	12
C	48 ( $\frac{1}{3}$ )	

Streak out samples of prototrophs on EMB to test for segregation.

A2 8 Lac+ 16 Lac-

A1. 14 Lac+ 11 Lac-

No Lac<sub>v</sub> noted in these tests. The effect of Mg should be checked.

Gal + Lac +	Mal -	Xyl -	Mtl -	Ar -	47
"	"	"	"	Ar +	4
Gal - Lac -	Mal -	Xyl -	Mtl -	Ar -	68
" "	"	"	Mal +	Mtl + Ar -	1
" "	"	"	"	Mtl - Ar -	1
+++++					7
+++++ Ar -					1
Lac - Gal +	--	--			1
" "	--	Ar +			2
Lac - Gal + Malt + Xyl + Ara +			Mtl -		1
Lac + Gal + Malt +	---				1
" " " Ar +	--				1
Lac + Gal -	---				2

Ar difficult to score. Lac/Gal; Xyl/Mtl generally linked as - - - - .

Redeck the 7 full +++++ for diploidy tests. "546A"

516a

546a

5-169.

B-44°

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
X	

Mill  
T  
↓  
T  
+  
-  
OK

*Mal*

Arab

X

Pool data from prototrophs received in various treatments.

# Fermentation Tests

5/8

W	Mal	Lac	Glu	Gal	Mtl	Zyl	arab
958	-	S	-	-	S	S	+ S
959	-	-	-	-	-	-	+++ +
960	-	-	-	-	-	-	+++ +
961	-	-	-	-	-	-	+++ +
962	-	-	-	-	-	-	+++ +
963	-	-	-	-	-	-	+++ +
964	-	-	-	-	-	-	+++ +
965	-	-	-	-	-	-	+++ +
966	-	-	-	-	-	-	+++ +
967	-	-	-	-	-	-	+++ +
968	-	-	-	-	-	-	+++ +
969	-	-	-	-	-	-	+++ +
970	-	-	-	-	-	-	+++ +
971	-	-	-	-	-	-	+++ +
972	-	-	-	-	-	-	+++ +
973	-	-	-	-	-	-	+++ +
974	-	-	-	-	-	-	+++ +
975	-	-	-	-	-	-	+++ +
976	-	-	-	-	-	-	+++ +
977	-	-	-	-	-	-	+++ +
978	Gal	Lac	Glu	Mtl	Zyl	Mal	arab
979	-	-	-	-	-	-	+++ +
980	-	-	-	-	-	-	+++ +
981	-	-	-	-	-	-	+++ +
990	Gal	Lac	Glu	Mtl	Zyl	Mal	arab
991	-	-	-	-	-	-	+++ +
992	-	-	-	-	-	-	+++ +
993	-	-	-	-	-	-	+++ +
994	-	-	-	-	-	-	+++ +
995	-	-	-	-	-	-	+++ +
996	-	-	-	-	-	-	+++ +
997	-	-	-	-	-	-	+++ +
998	-	-	-	-	-	-	+++ +
999	-	-	-	-	-	-	+++ +
1000	-	-	-	-	-	-	+++ +
1001	-	-	-	-	-	-	+++ +

\* suitable  
as markers.

\* light centres, also in others to some extent.

## Separation of H<sub>2</sub>O<sub>2</sub>

548b

Mosaics from (lac v) streaked out either on lac or Mal E MB.  
4, 1 - tested from each, on lac, Mal, TS.

H, I- Tested from each, or lac, Mal, T5.

1 2 3 4 5 6 7 8 9 10  
+ + + + + + + + + +  
- + + - - + + + +  
+ + + + + + + + + +  
+ + + + + + + + + +  
+ + - - - + + + + +  
+ + + + + + + + + +  
- - + + + + + + + +  
+ + + + + + + + + +

{	Lac+	41	0	41
	Lac-	28	18	46
		64	18	

Malt +	Malt -	
16	0	16
20	36	56
36	36	

	Mal+	Mal-		Mal+	Mal-		Mal+	Mal-		Mal+	Mal-
1	-	-		-	-		-	-		-	-
2	-	-		-	-		-	-		-	-
3	-	-		-	-		-	-		-	-
4	-	-		-	-		-	-		-	-
5	-	-		-	-		-	-		-	-
6	-	-		-	-		-	-		-	-
7	-	-		-	-		-	-		-	-
8	-	-		-	-		-	-		-	-
9	-	-		-	-		-	-		-	-
10	-	-		-	-		-	-		-	-

all  $T^A$  in these facts!

From these data the adjusted table is:

<i>bact+</i>	<i>Mel+</i> 31	<i>Mel-</i> 0	31
<i>bac-</i>	38	31	69
	<u>69</u>	<u>31</u>	<u>100</u>

$$\text{i.e., } \text{H}^+ = 67\% \\ \text{L}^+ = 33\% = \text{M}^-$$

7(b) This analysis is liable to vitiation if  
Met-is regressive to base !

549

W977 *Gal mutabilis* cem

5/31 ff/49.

45 EMB { Galactose. 150 scoreable colonies.  
30 T 2

1 good Gal - mutant

~~W977~~

W977x W677 (Mal alleles)

16 possible + 1 493 - . Many Mal<sub>v</sub>. Restrake  $\approx$  4 m Mal's.

# 9, 12, 11, 1, 2, 6, 8, 3?

13, 19, 5, 7

Hit

-

Others? These may be Mal<sub>x</sub> + Mal<sub>xv</sub>. Hold momentarily.

551A4 isolated from brush on EMS loc.

No Mal+ colonies, but papillated background.

Mal+ probably contaminant, not part of heterozygote.

Ca 90% Lac<sub>v</sub>

check - single col. from lac EMS.

4 → Lac<sub>v</sub> pure Mal -